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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Inventor(s): Yunchang Zhang, et al

Patent No.: 6,866,794 B1

Serial No.: 09/716,846

Issued: March 15, 2005

Filed: November 15, 2000

For: STRONTIUM PEROXIDE  
CATALYZED OXYGEN GENERATING  
COMPOSITIONS

Examiner: Cephia D. Toomer

Group Art Unit: 1714

Docket No.: BEAER-54677

June 15, 2005

Los Angeles, California

Certificate  
JUN 28 2005  
of Correction

REQUEST FOR CERTIFICATE OF CORRECTION

Certificate of Corrections Branch  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

The above-identified patent has been found to have the errors set forth in the enclosed Certificate of Correction. It is requested that this Certificate of Correction be issued and returned to us. Since the errors occurred in the final printing phase of the patent, no fee is enclosed. However, should the Office determine that a fee is required, please charge our account no. 06-2425.

The errors are verifiable in the patent application file as follows:

<u>ERROR</u>	<u>VERIFICATION</u>
Column 4, line 53, insert --an-- after "with". Column 5, line 7, delete "is" and insert --are--. Column 5, line 54, insert --,-- after "catalyst". Column 5, line 62, insert --in-- after "ingredients". Column 5, line 63, insert --these-- after "water". Column 6, line 6, insert --metal-- after "Other". Column 6, line 13, delete "composition" and insert --decomposition--. Column 6, line 23, insert --an-- after "in". Column 6, line 59, insert --this-- after "critical to". Column 7, line 21, insert --of-- after "formation". Column 7, line 58, delete "have" and insert --has a--. Column 7, line 58, insert --a-- after "and". Column 9, line 7, delete "NaCl <sub>3</sub> " and insert --NaClO <sub>3</sub> --. Column 9, line 26, insert --120 -- before "grams".	See page 3, Amendment dated September 30, 2002. See page 3, Amendment dated September 30, 2002. See page 4, Amendment dated September 30, 2002. See page 4, Amendment dated September 30, 2002. See page 4, Amendment dated September 30, 2002. See page 4, Amendment dated September 30, 2002. See page 4, Amendment dated September 30, 2002. See page 5, Amendment dated September 30, 2002.  See page 5, Amendment dated September 30, 2002. See page 6, Amendment dated September 30, 2002. See page 6, Amendment dated September 30, 2002. See page 7, Amendment dated September 30, 2002. See page 7, Amendment dated September 30, 2002. See page 7, Amendment dated September 30, 2002. See page 9, Amendment dated September 30, 2002. See page 9, Amendment dated September 30, 2002.

Attached hereto, in duplicate, is Form PTO-1050, with at least one copy being suitable for printing.

A duplicate of this document is attached.

Respectfully submitted,

FULWIDER PATTON LEE & UTECHT, LLP

By:

James W. Paul  
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JWP/pp/lm  
Enclosures

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92769.1

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 6,866,794 B1  
DATED : March 15, 2005  
INVENTOR(S) : **Yunchang Zhang and James C. Cannon**

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 4, line 53, insert --an-- after "with".  
Column 5, line 7, delete "is" and insert --are--.  
Column 5, line 54, insert --,-- after "catalyst".  
Column 5, line 62, insert --in-- after "ingredients".  
Column 5, line 63, insert --these-- after "water".  
Column 6, line 6, insert --metal-- after "Other".  
Column 6, line 13, delete "composition" and insert --decomposition--.  
Column 6, line 23, insert --an-- after "in".  
Column 6, line 59, insert --this-- after "critical to".  
Column 7, line 21, insert --of-- after "formation".  
Column 7, line 58, delete "have" and insert --has a--.  
Column 7, line 58, insert --a-- after "and".  
Column 9, line 7, delete "NaCl<sub>3</sub>" and insert --NaClO<sub>3</sub>--.  
Column 9, line 26, insert --120 -- before "grams".

92763.1

MAILING ADDRESS OF SENDER:

**James W. Paul**  
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PATENT NO. 6,866,794 B1

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This collection of information is required by 37 CFR 1.322 and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing the burden, should be sent to the Chief of Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450 Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORM TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner of Patents P.O. Box 1450 Alexandria, VA 22313-1450

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PATENT

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: BOX NON-FEE AMENDMENT, Commissioner for Patents, Washington, D.C. 20231 on September 30, 2002.

James W. Paul, Reg. No. 29,967



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

YUNCHANG ZHANG, et al.

Serial No. 09/716,846

Filed: November 15, 2000

For: STRONTIUM PEROXIDE )  
CATALYZED OXYGEN )  
GENERATING COMPOSITIONS )

) Examiner: Cephia D. Toomer

) Group Art Unit 1714

) Docket No. BEAER 54677

) Los Angeles, California 90045

) Date: September 30, 2002

AMENDMENT

BOX NON-FEE AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

This is in reply to the Office Action dated July 3, 2002, setting a shortened statutory period for a response of three months.

Please enter the following amendments.

IN THE SPECIFICATION:

Please amend the paragraph at page 6, lines 15-22 to read as follows:

Strontium peroxide provides all the benefits without the problems associated with the use of sodium oxide and peroxide, barium peroxide, lithium peroxide, calcium hydroxide and magnesium oxide and hydroxide. Strontium peroxide is more alkaline than magnesium oxide and calcium hydroxide and thus is more effective as a chlorine suppressant. It is not as caustic as sodium oxide and peroxide. Strontium peroxide is not considered toxic and thus is more environmentally friendly. It is stable enough so that water can be added to the compositions containing strontium peroxide, to facilitate the mixing and pressing.

Please amend the paragraph at page 7, lines 1-7 to read as follows:

Strontium peroxide is a moderately active catalyst for the decomposition of the chlorate and perchlorates by itself and is a moderately active inhibitor for the decomposition when used with an active transition metal oxide catalyst such as cobalt oxide. Therefore, several percent of strontium peroxide can be used in the compositions. It is much easier to

distribute several percent of strontium peroxide than to distribute a fraction of a percent of the other alkaline compounds in the chlorate and perchlorates.

Please amend the paragraph at page 7, lines 14-20 to read as follows:

Strontium peroxide decomposes at 410°C to strontium oxide and oxygen and thus can be used as a secondary oxygen source. This would increase the overall oxygen yield of the chemical cores with other things being equal. Therefore, chemical oxygen generating compositions with strontium peroxide as a chlorine suppressant, catalyst, reaction rate modifier, and a secondary oxygen source are superior to chemical oxygen generating compositions using other chlorine suppressants, and reaction rate modifiers.

Please amend the paragraph from page 8, line 21, to page 9, line 5 to read as follows:

The invention is accordingly embodied in an oxygen generating composition for producing a breathable oxygen gas upon activation of a chemical oxygen generator containing a chemical core made of the chemical composition comprising an oxygen source selected from the group of alkali metal chlorates, alkali metal perchlorates, and mixtures

thereof, a metal powder fuel, and strontium peroxide as a chlorine suppressant, catalyst, reaction rate modifier and a secondary oxygen source. The chemical oxygen generating composition can optionally also comprise a transition metal oxide catalyst and can further include a binder as a press aid. The chemical core generally has more than one layer, and each layer has a different composition. The chemicals for each layer are mixed separately, and a small amount of water is used to wet the chemicals to facilitate the mixing. The several chemical ingredients in the composition have different particle sizes and different densities. Without water these ingredients tend to segregate from each other. When water is added to the mixture, however, the minor ingredients will stick to the chlorate and perchlorate particles and do not segregate.

Please amend the paragraph at page 9, lines 6-14 to read as follows:

In a presently preferred embodiment, the oxygen generating composition of the invention generally comprises about 0.5-15% by weight of a metal powder as a fuel to supply the extra heat to sustain the decomposition of the oxygen source. The presently preferred fuel includes tin powder and iron powder, or a combination of the two powders. Other metal powders such as titanium and copper can also be used as fuels, as long as they have high purity and a small particle size. Aluminum and magnesium can also be used

because they are substantially free of carbon and are energetic, and other similar metal powders or other types of fuels may also be suitable as a fuel to supply the extra heat to sustain the decomposition of the oxygen source.

Please amend the paragraph at page 9, lines 15-27 to read as follows:

The oxygen generating composition may optionally contain up to about 15% of a transition metal oxide catalyst, and in a presently preferred embodiment, the oxygen generating composition comprises from zero to about 12% by weight of a transition metal oxide catalyst. The transition metal oxide catalyst can, for example, be selected from the group consisting of cobalt oxide, nickel oxide, copper oxide, and mixtures thereof. Since these metal oxide catalysts are so active that the decomposition of the alkali metal chlorate and perchlorate oxygen source can occur in the solid phase. Decomposition in the solid phase may result in an erratic or uneven oxygen flow rate and thus is not preferred. Therefore, it is beneficial to use a reaction rate modifier to reduce the catalytic activity of the catalysts slightly so that the decomposition of the oxygen source occurs in a viscous partially molten phase. This permits smooth release of the oxygen gas generated through the decomposition of the alkali metal chlorates or perchlorates.



Please amend the paragraph at page 10, lines 16-23 to read as follows:

The use of strontium peroxide as a chlorine suppressant and at the same time as a catalyst, reaction rate modifier and an additional oxygen source is considered to be critical to this invention. Strontium peroxide in powder form as supplied by Barium & Chemicals Inc. and by Hummel Croton, Inc. is suitable. The strontium peroxide meets MIL-S-612B standards and contains about 92% strontium peroxide, 4-6% strontium carbonate, and 2-4% strontium hydroxide. Strontium peroxide from other sources should also be suitable as long as it has a small particle size and a high content of strontium peroxide.

Please amend the paragraph at page 11, lines 4-9 to read as follows:

In the top layers of a chemical oxygen generating core, strontium peroxide can be used in combination with cobalt oxide so that the top layers can have a high and smooth oxygen flow rate. Strontium peroxide suppresses the catalytic activity of cobalt oxide slightly so that oxygen is generated in a controlled and even manner, and it suppresses the formation of chlorine. In a presently preferred embodiment about 0.5 to 4% strontium peroxide can be used in the top layers with cobalt oxide.

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Please amend the paragraph from page 11, line 29, to page 12, line 9 to read as follows:

In forming a chemical oxygen generating core, the minor constituents, including the strontium peroxide, the metal powder fuel, the optional transition metal oxide catalyst (if used) and the optional press aid material or binder (if used), are premixed. The premixed minor constituents are then mixed with the chemical oxygen source material. Approximately 1 to 5% water is used to wet down the mixture to facilitate the mixing. The metal powder strontium peroxide typically has a higher density and a smaller particle size than the alkali metal chlorates and perchlorates, and tends to segregate from the chlorates and perchlorates if no water is used. When water is used, the particles of the chlorates and/or perchlorates are wet, and the minor constituents particles can stick to them to prevent segregation. The chemical cores thus made are then dried in an oven at about 120°C to remove the water added.

Please amend EXAMPLE 1 at page 13, lines 13-24 to read as follows:

EXAMPLE 1

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- 1st layer: 15 grams. 11.0% tin powder, 9.0%  $\text{Co}_3\text{O}_4$ , 2.0%  $\text{SrO}_2$ , 4.0% glass powder and 74.0%  $\text{NaClO}_3$ .
- 2nd layer: 37 grams. 7.0% tin powder, 2.0%  $\text{SrO}_2$ , 1.0% glass powder, 2.0%  $\text{Co}_3\text{O}_4$ , and 88.0%  $\text{NaClO}_3$ .
- 3rd layer: 63 grams. 7.0% tin powder, 2.0%  $\text{SrO}_2$ , 1.3%  $\text{Co}_3\text{O}_4$ , 1.1% glass powder and 88.7%  $\text{NaClO}_3$ .
- 4th layer: 90 grams. 3.5% iron powder, 3.0%  $\text{SrO}_2$ , 2.0% glass powder, 91.5%  $\text{NaClO}_3$ .
- 5th layer: 40 grams. 1.5% iron powder, 3.0%  $\text{SrO}_2$ , 2.0% glass powder and 93.5%  $\text{NaClO}_3$ .

Please amend EXAMPLE 2 at page 14, lines 6-17 to read as follows:

#### EXAMPLE 2

- 1st layer: 15 grams. 11.0% tin powder, 9.0%  $\text{Co}_3\text{O}_4$ , 2.0%  $\text{SrO}_2$ , 4.0% glass powder and 74.0%  $\text{NaClO}_3$ .
- 2nd layer: 37 grams. 7.0% tin powder, 2.0%  $\text{SrO}_2$ , 1.0% glass powder, 2.0%  $\text{Co}_3\text{O}_4$ , and 88.0%  $\text{NaClO}_3$ .

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3rd layer: 63 grams. 7.0% tin powder, 2.0%  $\text{SrO}_2$ , 1.3%  $\text{Co}_3\text{O}_4$ , 1.1% glass powder and 88.7%  $\text{NaClO}_3$ .

4th layer: 90 grams. 3.5% iron powder, 2.0%  $\text{SrO}_2$ , 0.2%  $\text{Co}_3\text{O}_4$ , 2.0% glass powder, and 92.3%  $\text{NaClO}_3$ .

5th layer: 40 grams. 1.5% iron powder, 3.0%  $\text{SrO}_2$ , 2.0% glass powder and 93.5%  $\text{NaClO}_3$ .

Please amend EXAMPLE 3 from page 14, line 24, to page 15, line 5 to read as follows:

### EXAMPLE 3

1st layer: 20 grams; 11.0% tin powder, 9.0% cobalt oxide, 1.0%  $\text{SrO}_2$ , 3.0% glass powder, and 76.0%  $\text{NaClO}_3$ .

2nd layer: 50 grams; 7.0% tin powder, 2.0%  $\text{SrO}_2$ , 2.3% cobalt oxide, 1.5% glass powder, and 87.2%  $\text{NaClO}_3$ .

3rd layer: 90 grams; 7.0% tin powder, 2.5%  $\text{SrO}_2$ , 1.4% cobalt oxide, 1.5% glass powder and 87.6%  $\text{NaClO}_3$ .

4th layer: 120 grams; 3.5% iron powder, 4.0%  $\text{SrO}_2$ , 1.5% glass powder and 91.0%